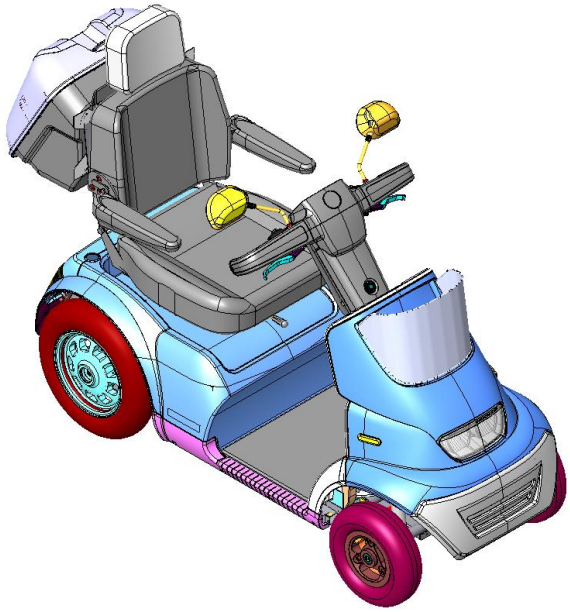
BREEZE-S

The Senior Class Lifestyler

Maintenance Manual



AFIKIM ELECTRIC VEHICLES™

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1. Safety instructions

1.1 General:

1.1.1 Technicians who are servicing the scooter should be authorized to service the scooter.

1.1.2 Technicians who are servicing the scooter should be aware and follow all safety instructions within the User Manual.

1.1.3 Technician should follow general safety instruction like using gloves, safety glasses when needed.

1.1.4 The scooter weight with batteries is about 150 kg even lifting 1 wheel is about 40 kg. Always use other people help or a appropriate lifting device.

1.1.5 When lifting always use your legs and not your back.

1.1.6 The battery weight is about 24 kg . The power unit weight is about 25 kg. The seat weight is about 15kg.

1.1.7 Never do any change in the product before consulting the manufacturer engineering. Remember the products are approve as they are , any chage remove the manufacturer responsibility for the safety of the product.

1.2 Drive :

1.2.1 Technicians who are drivinging the scooter should be aware and follow all safety instructions within the User Manual.

1.3 Mechanic :

1.3.1 It is possible that a technician will need to operate the scooter when he is standing on the side ,working on different assemblies.

1.3.2 When no electric power and operation needed , always Stop the power by Switch OFF and disconnecting the battery terminals.

1.3.3 Never put any part of your body under the scooter parts.

1.3.4 If necessary, first place a wood block under, to make sure no injure will happen.

1.3.5 Use standard tools. Use them according to their safety instructions .

1.4 Electric :

1.4.1 If necessary to operate the scooter when you are not seating on it. In such cases you should be aware to the parts that can move by power – Power unit shafts and wheels.

1.4.2 Never put your hands close to a part that is moving or turning. Be aware that your cloth will not be trapped into one of the moving parts.

1.4.3 Batteries contain a large electric energy inside. This energy can cause sparks and heat metals when short circuiting.

1.4.4 When working on the battery terminals, make sure no to short circuit between any 2 terminals. This can cause strong spars and make the tools very hot.

1.4.5 When working on the batteries, use protecting gloves and safety glasses.

1.4.6 Battery contains acid. Never open any of the battery case. If you see any liquid or Gel aside, beware of it. It might be Acid.

2. Specific Tools for technicians

- Standard tool box (wrenches, socket-head cap screw , hexagon keys, Phillips (crosshead) tip and/or screwdrivers, etc.)
- Voltmeter (To measure 24VDC)
- Air pressure gauge (To measure 35 psi)
- Batteries tester (under load)
- Density meter
- Valve Wrench
- Wooden blocks to elevate the Breeze during checks, maintenance and repairs:
  - ✓ 2 blocks 20-22 centimeters height to place beneath the batteries box.
  - ✓ 2 blocks 14-16 centimeters height to place beneath the foot rest area.
  - ✓ **Remark** : Always before operating a lifted Breeze make sure that the 2 rear wheels are free to turn , so that the scooters will not move.

3. Specific Parts:

We recommend the availability of the following set of test and repair assemblies:

1. Handlebars switches – Left and Right
2. Front Board
3. Display LCD Board
4. Main Harnesses Cable.
5. Main Lights Harness Cable.
6. Main Supply Harnesses.
7. Controller SDrive 140A - P&G
8. Motor/Power Unit
9. Also it is very much recommended hold and use P&G SP-1 Programmer (for S-Drive, possible to upgrade old model to modified free of charge).

4. Options / Accessories assembling drawing /instructions

See attached accessories assembling drawing:

"Breeze S accessories1.pdf"

5. Mechanical Adjustments

#	Description	Where	How to Adjust
1	Seat Height	Seat pin under the battery cover. See attached assembling drawing: **"Breeze S(4W) assembling.pdf"**	Release both secure bolt and level bolt. Change pin Level hole as required . Resecure bote level bolt and secure bolt. Adjustments : 3 x 20 mm.
2	Tiller Height	Tiller bottom adaptor under the rubber cover. See attached assembling drawing : **"Breeze S(4W) assembling.pdf"**	Release the secure nut and screw , adjust height and resecure again the screw and the nut. Adjustments : 40 mm continues.
3	Rear Shock absorber Load	Rear Shock absorber under the battery cover. See attached assembling drawing : **"Breeze S(4W) assembling.pdf"**	I t is possible to replace the whole shock absorber for persons until 120 Kg and above. Also it is possible to adjust the the load rate by changing the Sprint pretention. 5 stages are possible : 20% / 40% / 50% / 80% / 100% Should be fit to user weights: 80 / 100 / 120 / 140 / 160 kg Remark: The Adjust should fit the comfort of the user .

6. Front Electronics Board Setup

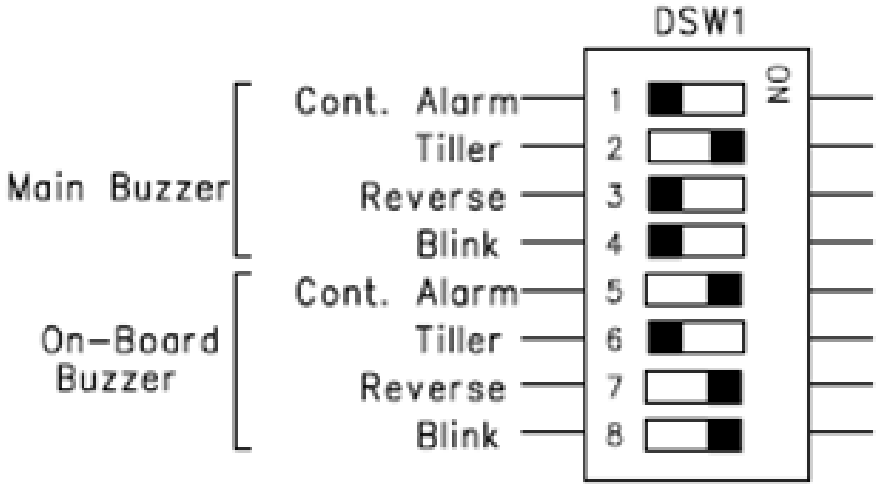
There are 2 horns in the Breeze S :

One is main Buzzer – external, located at the front of the tiller.
Second is Internal Buzzer located on the front board.

Each one of the Horns can be setup to work in one of the follows options : Controller alarms,Tiller push button , Reverse alarm , Blinkers alarms.

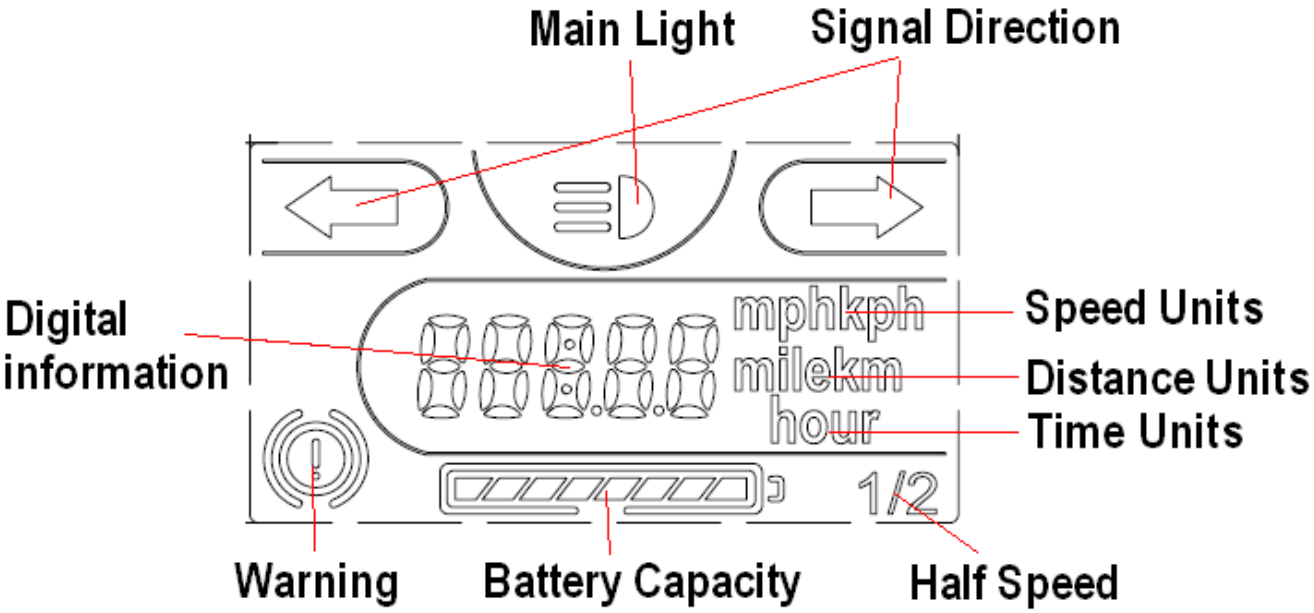
The front board include setup options for the Horn. This can be done with the dipswitch DSW1 that is on the front board.

Dip Switches Setup is as follows : (Shown the Default Set Up)



7. LCD Display Set Up and User Manual

a. LCD Display:



Push buttons:

b. **Right – Mode** : Use to change between different display modes and to Reset the Distance and Time.

Every push - changes the display mode cyclic (Speed ,Trip Distance ,Trip Time , Clock). Return automatically to initial (Speed) after 5 seconds.

Long Push - (more than 7 seconds) when change Modes:

Trip Time : Reset Trip time.

Trip Distance : Reset Trip Distance.

Time : Enter to Clock setup.

c. **Left- Setup** : Use to adjust the clock.

d. **Internal LED**: Use for a technician. Can be seen only from the bottom side of the LCD board. When LCD board active – flashes to indicate OK.

e. **Display Legend**:

Signal Direction - Use to show Blinkers working.

Main Light - Use to show Front lights and rear Pilot lights are working.

Digital information - Shows : Speed ,Distance of Trip ,Time of Trip, Time or Faults Codes.

Speed Units – Show mph(miles per hour) or kph (kilometers per hour).

Distance Units- Shows: mile (miles) or km (kilometers).

Time – Shows Hour = HH:mm (hours:minuts).

Half Speed – shows 1 (full) or 1/2 (half speed)

Battery Capacity – 8 Bars =full , 1 bar = empty, between is proportional.

Also flashes at a CODE when there is a controller fault CODE.

Warning / Inhibit - Indicate when the motor is heated , and when the EMB is opened.

Dip Switches:

f. #1-2-5: User Modes setup with relate to user needs.

State	Description
"0" = On - On - On	Regular (Speed,Distance,Time ,Clock)
"1" = Off - On - On	Minimal (No Digital Information)
"2" = On - Off - On	Speed only
"3" = On - Off - Off	Speed and Distance only.
"4" = On - On - Off	Hour only.

g. #3: Controller Type setup –

State	Description	Remark
Off	PG SDrive	Battery status from Controller
On	Dynamic Rhino	Battery status calculated upon Algorithm (22-24 VDC)

h. #4: Units setup (Europe or US)

State	Speed	Distance	Date (in Clock mode)
Off = Europe	kmh	km	DD.MM
On = USA	mph	mile	MM.DD

i. #6: Pulses per km

State	curve	product
Off	740 pulse / km	Breeze S = wheel diameter = 430 mm
On	1044 pulses / km	Breeze C = wheel diameter = 305 mm

j. Clock Adjust:

Every push on **Mode** change different time unit and this unit is Flashing.

When Flashing , every push on **Setup** increase 1 unit.

Stage	Display	Flashing
1	HH:mm	mm
2	HH:mm	HH
3	DD.MM or MM.DD	DD
4	DD.MM or MM.DD	MM
5	20YY	YY

6		Save of Updated Time and Date

k. Controller Fault Code : ~~will be shown together with Speed ,changed every 2 seconds~~.

~~"Er xx" , xx= Code known by the controller~~.

~~"Bat x", x= Battery Codes 1-3~~.

Will be shown on Batt. Icon upon controller fault code.

l. Technician state : active when Mode button is pressed :

(a) Will show software version, before it returns to regular work mode.

(b) LED will flash constant until the LCD board is OFF.

Note: it needs a complete OFF , not only Power signal change.

8. Controller Programming / Setup

If the user cannot find a position on the half speed limit switch control that suits him, the controller can be programmed to meet his needs. The controller can be programmed in two ways – with an SP1 Programmer or specialist PC software and interface cable.

The SP1 is a small hand-held unit which can be plugged into your controller to alter the program.

The PC Programmer is a piece of PC software and an interface cable. When the software is installed onto a PC, it can then be connected to the controller by using the special interface cable. The controller can then be programmed using a windows type environment

The programming tools may be included with your scooter. If they are not, the scooter distributor or service agent or scooter manufacturer will are able to program the controller.

If you have a programmer, read the user guide before you use it.

If you re-program your controller, make sure that you observe any restrictions given in your scooter user manual. Note any changes you make for future reference.

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT electronic controllers. Incorrect programming could result in an unsafe set-up of a scooter for a user. PGDT accept no liability for losses of any kind if the programming of the controller is altered from factory pre-set values.

9. Controller Parameters List

See external separated file.

10. Periodic maintenance Check

No.	Type of Service	Who	Frequency
1	Check air pressure in all tires.	User	Every week
2	Check emergency brakes	User	Every week
3	Check normal drive and stop	User	Every Month
4	Check tires wear	User	Every Month
5	Check for missing parts and damaged parts .Use the figures #1,2,3,4 .	User	When receiving the ***Breeze S*** or after a long time not using it.
6	Check emergency brake	User	Every Month
7	Check secure of all screws and parts	Technician	Once a year by technician.
8	Batteries replacing.	Technician	Every 2-3 years , after about 300-400 full cycles of charge/discharge. When short travel distance and/or technician check. **Note: To Replace the batteries, the Seat and Battery Cover located under the Seat must be removed.**
9	Cleaning	User Technician	External – when needed. Internal – Once a year.
10	Check power unit	Technician	Check noise , clearance , current on surface should be 12 to 15 Amp.
11	Check Emergency Brake	Technician	Once a year.

Periodic maintenance - continue	
Removing the Seat and the Batteries Cover(2)	Turn the Seat by using the lifting Lever (7.5) so that the Lever will point 45º Right or Left. The Seat can be removed only at this position. Remove the Seat (7): Hold the Seat in your two hands – one hand on the backrest and a second hand at the front lower part of the seat and lift the seat up from its pivot. **Warning**! **The seat weight is 15 Kg (33lbs).** Keep lifting with your Knees/legs and not loading your Back. Release Battery Cover (2) securing screws (2.6). Lift the Battery Cover (2) until it is released from the Seat Pivot .
Replacing the Batteries Cover(2)	The replacement of the Gray Cover is done in reverse order; MAKE SURE that the Gray Cover (2) fits onto it's place. Secure with the 4 screws (2.6).
Batteries	Batteries weight each ~23 Kg (~50 lbs) and over. Lift each battery only with the appropriate handle. Keep lifting with your Knees/legs and not loading your Back.
Tires	Correct air pressure in the tires is essential for optimal steering and stability of the ***Breeze S***. Check air pressure every two weeks. ±2 psi. Breeze 4W Inflate to the proper air pressure: 25 front tires: 20±2 psi. Golf wheels tires : 20±2 psi.
Cleaning	Use only a damp cloth and mild detergent. Never use a hose for cleaning. This may severely damage the power and electronic components.

11. Mechanical Fault troubleshooting

#	Description	Probable cause	Repair action
1	Noises from front steering and suspension system	Check front suspension for clearances and secure of bolts. Check front shock absorbers.	Replace wear parts, secure bolts. Replace if needed.
2	Front suspension not functioning properly.	Check front shock absorbers.	Replace if needed.
3	Excessive wear of front tires after short period.	Wear of bushings that cause clearances in the system. Un adjusted steering system.	Replace wear parts , Adjust the steering and secure.
4	Rear suspension Noisy.	Wear in power unit absorbing Rubbers. Check for clearances and unsecured parts. Check the shock absorbers.	Replace the absorbing rubbers if needed. Secure parts. Replace shock absorbers if needed.
5	Rear suspension not functioning	Check user weight and the fit of the absorbers. Faulty shock absorbers	Replace if needed Replace if needed
6	Noise from power unit.	Wear in power unit	Check and replace power unit if needed
7	Too short distance travel between charging	Power unit wear, consume high current. Also might be noisy.	Check noise and current and replace if needed.
8	Clearances in tiller	Unsecured screws and gas piston faulty	Check scure of screws. Replace gas piston if needed.
9	Scooter does not have power or does not brake	Wear in motor brushes.	Replace motor brushes.

	well or go to high speed downhill.		
10	Noises from motor	Wear of brushes. Faulty motor.	Check brushes and replace if needed. Replace motor.
11	Emergency handbrake does not stop	The brake cable is not tight or brake drum/disk is wear.	Tight cable and replace brake drum/disk if needed.
12	Flat tire and uneven and not smooth drive	Flat tire	Repair / replace tire's tube.

12. Control and Electronics system fault troubleshooting

12.1 General control system and Front Board Troubleshoots

The front board is the center of all peripheral functions of the scooter : Lights , Horn , Information goes to the LCD display .

Elimination troubleshoots:

The Front Board wiring connections are all quick connectors.

If you suspect the Front Board to be faulted we recommend as a quickest way to find if the Front Board is faulty, Doing by elimination – Just replace temporarily the Front Board with another working one and thus make sure if the problem is within the Front Board or somewhere else.

Check all connection of the Front Board, following the wiring diagram that can be found within this maintenance manual.

Check main and Charging fuses, located near the rear wheels.

Also always check related function switch , as example Light does not work , first check the light switch for continuity ,when is in ON position. Use the wiring diagram to figure the proper terminals to check each function switch terminals.

12.2 Trouble Shoot Table:

#	Description	Probable cause	Repair action
1	First check that Front Board internal LED flashes. If it is not Flashing.	Front Board is faulty or no power supply to the board.	Check Supply. If OK than Front Board is Faulty – Replace it.
2	If LCD is not working, check if LCD internal LED flashes. If it is not flashing.	LCD board is faulty or no power supply to the board.	Check supply. If OK than LCD board is faulty – Replace it.
3	Front light doesn't work	Front LED board faulty	Replace front LED board
		Front Board faulty	Replace Frond Board
4	Front Blinker/s doesn't work	Front Blinker board faulty	Replace front Blinker board
		Front Board faulty	Replace Frond Board
5	Rear pilot/s light does work	Rear Blinker board faulty	Replace Rear Blinker board
		Front Board faulty	Replace Frond Board
6	Rear Blinker/s doesn't work	Rear Blinker board faulty	Replace Rear Blinker board
		Front Board faulty	Replace Frond Board
7	Horn does not work properly	External Horn is faulty	Replace Horn
		Internal Horn is faulty	Replace Frond Board
		Front Board faulty	Replace Frond Board
8	Hazard doesn't work	Hazard switch fault	Check switch and repair
		Front Board faulty	Replace Frond Board
9	Reverse function doesn't work	Reverse switch fault	Check switch and repair
		Front Board faulty	Replace Frond Board
10	Electric EMB release function does not work	EMB release Switch faulty	Check switch and repair
		Front Board faulty	Replace Frond Board
11	LCD is not powered ON	LCD board faulty	Replace LCD board
		Front Board faulty	Replace Frond Board
12	No Charge start	Charger fault	Replace charger
		Charge fuse popup or faulty	Reset /Replace charge fuse
13	Travel distance very low	Charger fault	Replace charger
		Old / Weak batteries	Check Batteries / charge batteries, Replace if

			needed.
14	The LCD does not keep the time	LCD battery end of life (after 3-5 years of use)	Replace the LCD Battery.
15	No power or main fuse pop out	Over load Mechanical fault Fault controller Faulty power unit Short circuit occur	Try to reset 2 times. Troubleshoot the fault. Replace the controller. Replace the power unit. Find and repair short circuit.

12.3 Controller / Drive Troubleshoots

The controller is the center of all driving functions of the Breeze S: Speed control , acceleration , deceleration , EMB (Electro Magnetic Brake used as parking brake) , Reverse drive , Speed limiting etc. . But still the functions of the controller are all connected to all the wiring, connectors and as well the Front board, power units and batteries.

Elimination troubleshoots:
The controller wiring connections are all quick connectors.
If you suspect the controller to be faulted we recommend as a quickest and way to find if the controller is faulty, Doing it by elimination – Just replace temporarily the controller with another working one and thus make sure if the problem is within the controller or somewhere else.

Check all connection of the controller, following the wiring diagram that can be found within this maintenance manual.

12.4 Controller Fault codes using the LCD:

Count the number of flashes in the battery indicator of the LCD and see the code in the follows Table (Each cycle there is a short stop of few seconds):

1 Flashes	The battery needs charging or there is a bad connection to the battery. Check the connections to the battery. If the connections are good, try charging the battery.
2 Flashes	There is a bad connection to the motor. Check all connections between the motor and the controller.
3 Flashes	The motor has a short circuit to a battery connection. Contact your service agent.
4 Flashes	The freewheel switch is activated or the manual brake disengagement mechanism is operated. Check the position of the switch or lever.
5 Flashes	Not used.
6 Flashes	'The S-drive is being inhibited from driving. Inhibit 2 is active'. This may be because the battery charger is connected or the seat is not in the driving position.
7 Flashes	A throttle fault is indicated. Make sure that the throttle is in the rest position before switching on the scooter.
8 Flashes	A controller fault is indicated. Make sure that all connections are secure.
9 Flashes	The parking brakes have a bad connection. Check the parking brake and motor connections. Make sure the controller connections are secure.
10 Flashes	An excessive voltage has been applied to the controller. This is usually caused by a poor battery connection. Check the battery connections.

12.5 Controller Trip codes using programmer SP1 & actions to repair:

When the fault exists, connect the SP1 programmer's connector directly to the controller SDRIVE140 or to the charging socket, using a special wiring adaptor.

Trip Code	Action
A01	Quick switch ON / OFF. Switch OFF wait few seconds and ON again. Possible fault of main key-switch. If hundreds time suspect the keyswitch.
0300	Check the tiller & throttle wiring to the controller, then retest
0815	Check the tiller & throttle wiring to the controller, then retest
0A00	Check the sleep mode parameter is set correctly, then retest
0E07	Check the tiller & throttle wiring to the controller, then retest
0E08	Check the tiller & throttle wiring to the controller, then retest
1501	Check the solenoid brake's wiring & connections to the controller, then retest
1502	Check the solenoid brake's wiring & connections to the controller, then retest
1600	Check the batteries' wiring & connections to the controller, then retest Possible high voltage due to high load downhill. Possible to decrease the half speed parameter to 40% and instruct the user to drive 1/2 speed mode down-hills.
1601	Check the batteries' wiring & connections to the controller, then retest
1705	Internal faults in relay.
1E08	Check the wiring & connections to pin 4 of the programming socket, then retest
1E09	Check the wiring & connections to pin 6 of the 14 way tiller connector, then retest
1E0A	Check the wiring & connections to pin 14 of the 14 way tiller connector, then retest
2C00	Check the batteries' wiring & connections to the controller, then retest
2F01	Check the throttle is not displaced on start-up, then retest
2F01	Check the tiller & throttle wiring to the controller, then retest
3100	Battery connected whilst scooter is switched on. Turn off, wait 10 seconds, then retest
3B01	Check the motor wiring & the connections to the controller, then retest
3D02	Check the motor wiring & the connections to the controller, then retest
3D03	Check the motor wiring & the connections to the controller, then retest
3600	Internal un expected fault in the controller
4401	Internal controller fault
5300	Programmable parameter changed. Turn the scooter off, then on again, then retest
7000	Push at startup
7001	Push at drive
7C00	High temperature in the controller.
1E09	Inhibit activated. Can be caused by the electromagnetic brake lever micro switch or panic sensor.
All Others	Check all wiring & connections to the controller, then retest. Try replacing the controller.

12.6 Possible Faults symptoms and repair actions:

Symptom	Action
No power to programmer	Check the wiring & connections to the batteries, then retest
No power to programmer	Check the wiring & connections to the programmer, then retest
Scooter drives slowly	Check the controller is programmed correctly, then retest
Scooter drives slowly	Check the speed limiting function is not active e.g. seat raised,then retest
Scooter drives slowly	Check the solenoid brakes are not jammed, then retest
Status indicator does not light	Check the wiring & connections to the status indicator, then retest
Reverse alarm does not sound	Check the wiring & connections to the buzzer then retest
Reverse alarm does not sound	Check the buzzer is working correctly, then retest
Reverse alarm does not sound	Check the scooter is programmed correctly then retest
Scooter will not drive in reverse	Check the tiller wiring & connections, then retest
Scooter will not drive in reverse	Check the reverse switch is working correctly, then retest
In cases that the scooter with transaxle 12 km/hr is recoil.	Reduce the compensation parameter from 50 to 40.

Slow or Sluggish Movement

If the scooter does not travel at full speed and the battery condition is good, check the position of the speed limiting control. If adjusting the speed limiting control does not remedy the problem then there may be a non-hazardous fault.
Contact your service agent.

User Daily Checks

Throttle: With the scooter switched off, check that the throttle mechanism is not bent or damaged and that it returns to the position when you push and release it. If there is a problem do not continue with the safety checks and contact your service agent.

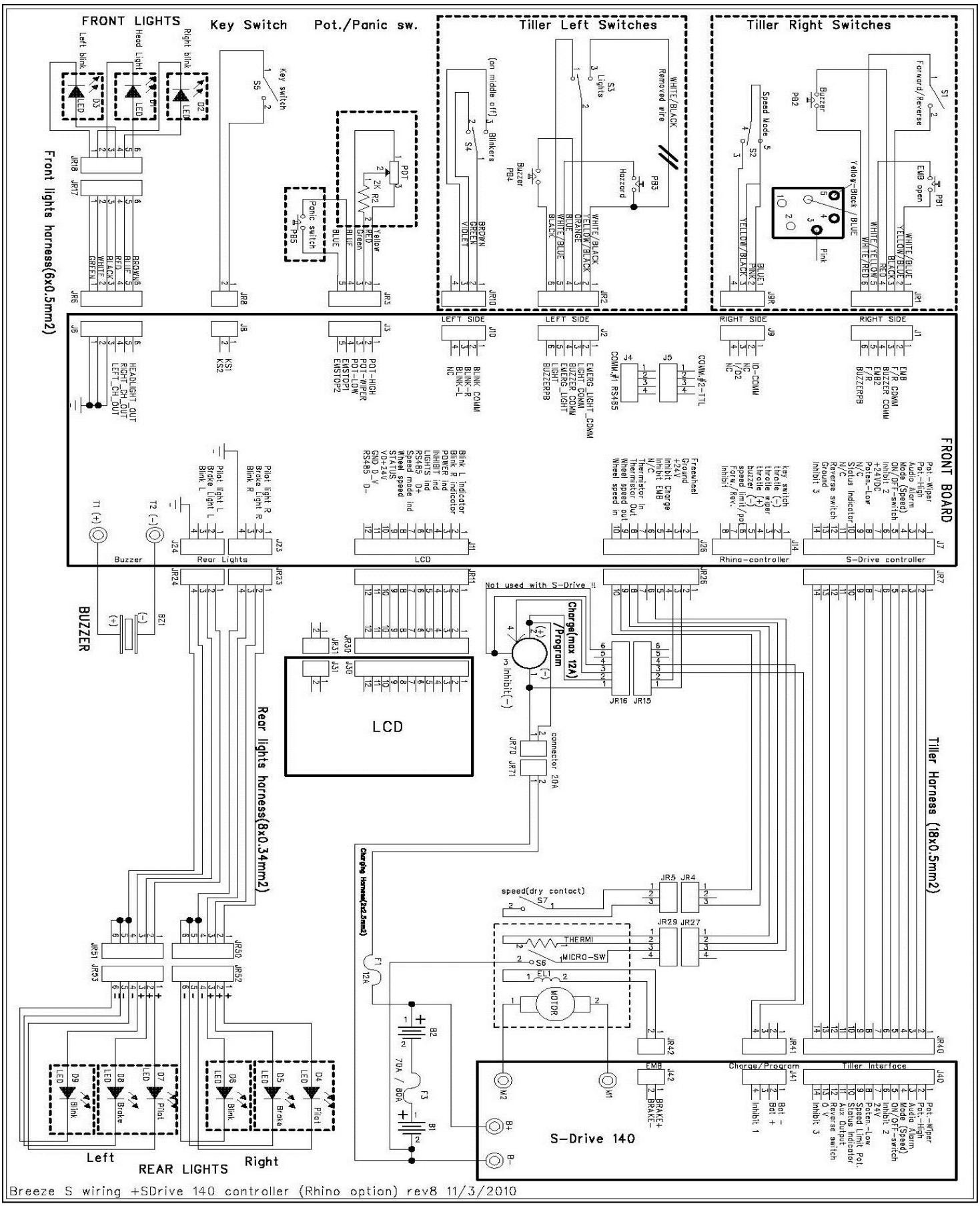
User Weekly Checks

Throttle: Put the throttle to the full speed forward position and switch the scooter on. The scooter should not move. show you that you have switched the scooter on with the throttle already pushed, a True Charge Trip type status indicator will display 7 Bars, whereas a single bulb (or LED) type status indicator will flash seven times sequence.
If the scooter does move, contact your service agent.
Parking brake: This test should be carried out on a level surface with at least one meter clear space around the scooter.
Switch the scooter on.
Check that the status indicator remains on, or flashes slowly, after half a second.
Go to drive the scooter slowly in the forwards direction until you hear the parking brake operate. The scooter may start to move.
Immediately release the throttle. You must be able to hear the parking brake operate within a few seconds.
Repeat the test in the reverse direction.
Cables and connectors:
Check that all connectors on the scooter are securely mated, and ensure that all cables are free from damage.

13. Mechanical assembly drawings

See attached assembling drawings: **Breeze S (4W & 3W) assembling.**

14. Electrical diagrams - General Wiring diagram


FRONT LIGHTS
Key Switch
Pot./Panic sw.
Tiller Left Switches
Tiller Right Switches
Front lights harness(6x0.5mm2)
FRONT BOARD
BUZZER
LCD
Rear lights harness(8x0.34mm2)
Tiller Harness (18x0.5mm2)
S-Drive 140
REAR LIGHTS
Left
Right
Breeze S wiring +SDrive 140 controller (Rhino option) rev8 11/3/2010

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